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# Performing Traditional Knowledge using a Game Engine: Communicating and Sharing Australian Aboriginal Knowledge Practices.

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## Abstract

*This paper challenges current practices in the use of digital media to communicate Australian Aboriginal knowledge practices in a learning context. It proposes that any digital representation of Aboriginal knowledge practices needs to examine the epistemology and ontology of these practices in order to design digital environments that effectively support and enable existing Aboriginal knowledge practices in the real world. Central to this is the essential task of any new digital representation of Aboriginal knowledge to resolve the conflict between database and narrative views of knowledge [5]. This is in order to provide a tool that complements rather than supplants direct experience of traditional knowledge practices [2]. This paper concludes by reporting on the recent development of an advanced learning technology that addresses this.*

## 1. Introduction

In response to requests by Australian Aboriginal elders and communities to preserve and communicate their culture for current and future generations, the process of gathering and documenting Aboriginal knowledge has accelerated in recent times. This has also been due to the increased capability of digital environments to store and manipulate large amounts of information in various accessible formats. Most recently it has been found that some formats are more

suited to representing the Australian Aboriginal oral cultural tradition (such as audio, video, graphics) than others. However, three important issues have arisen which continue to influence the design of these digital environments. These issues are:

- ownership of knowledge practices (how knowledge is formed, communicated, and recorded);
- purposes of knowledge practices; and,
- representation of knowledge practices.

This paper critiques how Aboriginal knowledge practices have been, until recently, represented in digital media and then suggest some prerequisite characteristics of such media if they are to support traditional knowledge traditions. Finally, a digital environment –Digital Songlines–that promises to fulfil many of these prerequisites is examined in more detail.

## 2. What is Aboriginal Knowledge Practice?

Aboriginal knowledge is a contentious area of study. This is because Aboriginal knowledge exists as a self-contained knowledge tradition. Its purpose is to reify culture and identity [6]. However, current technologies for the representation of this knowledge tend to embody assumptions that are based on a Eurocentric scientific knowledge tradition. This allows Aboriginal knowledge to be objectified and commodified for use in a wide range of ‘scientific’

fields. This raises key questions about the validity of current methods of study. A critical principle to be addressed is that Aboriginal knowledge is embedded and deeply associated with their land. This includes the relationships that people have developed with that land or 'country' over time. This knowledge is primarily situated in "kinship, language and humour" [3, p4]; not objects, artifacts, or recordings as such.

Hence, there are vital differences in Western (or in the specific context of the Australian experience - Eurocentric) and Aboriginal knowledge traditions and practices. Western traditions emphasise the differences between subject and object, between what exists and how we represent it in a variety of symbolic systems. By contrast Aboriginal knowledge traditions emphasise the unity of subject and object – of what exists and how we represent it. In Aboriginal knowledge traditions, language, ceremony, singing, dancing and other representational forms can influence events and cause things to happen. Objects and phenomena can be 'sung' into and out of existence. These processes of the amalgamation of representation and reality have been going on since the Dreamtime (in Australian Aboriginal terms, the time of creation of all things) and continue to this day.

In essence, the traditional Aboriginal understanding of the landscape is one constructed of parallel views of reality, each of which is bonafide in certain contexts – a landscape that exists in multiple forms simultaneously – visible, ancestral, mundane, sacred, and which can be accessed in any of these forms depending on the traditional knowledge requirements of that view. For example, a mountain is a topographical feature, but it is also the body of an ancestral being and a place of significant activities in their originary stories. Its 'place', in all its forms, must be addressed in every generation by knowledge practices such as ceremony and narrative. All of these parallel or layered views co-exist to form a "radical complexity and interconnectedness" [1, p5] which reinforces relationships through the passage of time.

### **3. The Digital Representation of Aboriginal Knowledge**

Any digital representation of Aboriginal knowledge practices needs to examine the epistemology and ontology of these practices. It should address the core characteristics which have enabled Aboriginal knowledge practices to persevere across large spans of time and, more recently, across rapidly changing contexts and alongside competing cultural traditions (urban aboriginal Australia). These core characteristics

may then enable the design of believable representations of Aboriginal knowledge practices in a digital environment. Such a digital environment would not only collect and describe this knowledge but allow virtual performance (traditional dance and song) and, more importantly, support the performance of these practices in the landscape. The form, meaning and purpose of these characteristics needs to be represented in order to present a more complete view of Aboriginal knowledge practices and to avoid what Christie [1] calls a 'cognitive injustice', that is, the selective emphasis of certain aspects of knowledge practices at the expense of other aspects. This cognitive injustice may currently serve the purposes of Western archives and commodities which utilize Aboriginal knowledge, but has failed to represent the deep and complex entirety of these knowledge practices and their primary purpose in maintaining cultural traditions.

It is apparent that Aboriginal people in many Australian communities have a real desire to preserve and pass on knowledge practices in spite of the decline in their use of traditional language, loss of ritual and passing away of elders. Digital environments provide many advantages for this task including portability, multi-media, interactivity and extensibility. However, the problem with digital tools seems to lie in designing environments that effectively support and enable knowledge practices in the real world of the Australian aboriginal. As Hart [2, p53] maintains: "there is a clear danger that digital tools and activities will supplant myths, rituals and learning about country from one's direct experience and immediate community." He asserts that the ways in which digital knowledge is used must be complementary to how this knowledge is used in the day-to day existence of Aboriginal people. If we accept that the purpose of many Aboriginal knowledge practices is to reaffirm relationships with the land, then the collective construction of digital objects is only one step in a knowledge practice. As Christie [1, p1] claims the power of a digital object is only truly articulated when it is incorporated into "further episodes of knowledge production," and by necessity these episodes must take place in the landscape.

### **4. The Features of a Supportive Digital Environment for Aboriginal knowledge**

Any supportive representation of Aboriginal knowledge should enable the user to become embedded in an extended collaborative, performative narrative which pursues a purposeful journey through a sentient landscape exploring and reaffirming

relationships with significant people and the land. However, the current state of representation of Aboriginal knowledge seems to be split into either data based tools or narrative based tools – collecting and telling. For all intents and purposes, in Western thought, the dichotomy between database and narrative presents a large obstacle. As Manovich [5, p12] states, the “database and narrative are natural enemies. Competing for the same territory of human culture, each claims an exclusive right to make meaning out of the world”.

Hence, any digital tool based exclusively on one or the other is presenting at best only half of the knowledge practice tradition. On the one hand, database tools struggle with the dual agendas of metadata and the selection of knowledge categories. On the other hand, purely narrative tools, such as digital storybooks, struggle with the linearity and simplification of the digital publishing formats. Both these types of tools also lack the essential capacity for the user to ‘perform knowledge’ (to actively participate in knowledge construction – a key part of learning), rather than merely access and manipulate what is given.

Although the database is increasingly pre-eminent symbolic form of information resource in a digital society [5], the enduring power of narrative has become recognized in recent times as adding meaning to the information. For example, in the work of Seely Brown (2000) he addresses the differences between logical argument and narrative which explains the power of narrative in the corporate world to reveal the various roles of narrative as sequential events, explanations of cause and effect and also as metadata. We can see the value of this approach in Huggins’ [3, p4] assertions that Aboriginal narratives are cultural institutions of collective memory which are “held in ‘lived’ experience”; that these narrative structures are not easily understood by conventional approaches to history and, “the only way the Indigenous narrative memory can be properly understood is through the paradigms of Indigenous people.” Hence, narrative forms a powerful ally as metadata in any knowledge data collection.

The role of narrative as metadata also raises the question of the nature of the Aboriginal knowledge paradigms and the forms in which they have been traditionally communicated. Christie [1] notes the importance of this in relation to the design of digital environments. He proposes that Aboriginal knowledge traditions are not taught but passed on in an intuitive manner based on relationships with people and the land. Aboriginal knowledge is transmitted through collective, experiential, performative activities based

on narratives told and retold through time. Therefore, in order to represent the totality of Aboriginal knowledge, any digital tool must make some headway in resolving the antagonism of narrative and database. In effect, for Aboriginal people, *the narrative is the database* – because the narrative itself embodies a mode of communication to which the database must be faithful. The narrative takes many forms—story, art, dance – but in all of these, real knowledge ‘objects’ are conveyed in a matrix of narrative. Thus the narrative provides the situation, the relationships, and reinforces the epistemological and ontological underpinnings of any activity. In a real sense, the narrative provides the metadata for any collection of knowledge ‘objects’ which are located in and associated with the landscape. What is needed is a vehicle for amalgamating the power of narrative and database.

## 5. The Digital Songlines Project

In an attempt to address the need to combine narrative and artefact as a database of knowledge which emulates Australian aboriginal cultural understanding, the Digital Songlines project was formed in 2003. It uses a computer game engine to immerse participants in a narratological landscape similar to that espoused by its indigenous contributors.

The Digital Songlines environment attempts to match important characteristics of Aboriginal knowledge in the way it is able to amalgamate the power of database and narrative. It represents a sentient landscape in which data objects are embedded in an interconnected network of multi-layered pathways or Songlines (pathways of Aboriginal knowledge practice). This network of data is made accessible by a matrix of interactive narrative which acts as a metadata structure for the data objects. In effect, the narrative and the situation in a landscape provide meaning, purpose and ownership to the data objects in an intuitive and complex manner which is extremely difficult for a conventional database to emulate.

As discussed, an ontologically flat database which dissolves the differences between data and metadata is more effectively representative of the nature of Aboriginal knowledge practices [1]. Hence, the Digital Songlines environment described in this paper had to allow the placement of knowledge in landscape, with purpose, in a performative manner and most importantly as narrative. It more supportively represents the intuitive and creative merging of data and metadata that is characteristic of Aboriginal knowledge. As such, it addresses these issues by

providing a supportive digital tool for Aboriginal knowledge practices.

## 6. The Proof-of-Concept Prototype

A highly resolved proof-of-concept prototype Digital Songlines application has been developed. It includes arrays of 3D objects used to recreate a landscape populated by indigenous flora and fauna. These assets have been imported into the game style application based on the Torque Game Engine. The active features include sound, animations, weather and daylight simulation. An established mechanism to import digital terrain models existed and it was modified for importing satellite based geo-spatial data, or data that is prepared for use in GIS software, for accurately mapping the cultural heritage landscape including ancient rock art [4] (see figures 1 & 2).

The terrain data in vector or raster based formats is layered with spatial attributes that identifies where the features are located in geographic space as relevant to Indigenous cultural heritage. The geo-spatial data includes various files that make up a cultural metafile set with vector data representing trade routes (Songlines), a table containing the artefacts belonging to significant places and their location, and data including the indigenous names for sites, watercourses, hunting grounds, scar trees and other significant places. These are positioned correctly in the 3D world using GPS. In addition, native vegetation specific to the area was included in the 3D world. Flora and fauna were surveyed and photographed on-site and modelled for inclusion in the environment [4].



Figure 1. Screen shot of the Digital Songlines project interface showing a simulated Australian landscape.

While the primary use of the tool has been in the area of cultural history, a wide range of potential educational installations have been identified including: museums, science centres, cultural centres, interpretive centres, community consultation, local councils, forestry, water resources, development organisations, schools, mining, safety training, media and data fusion capabilities [4].

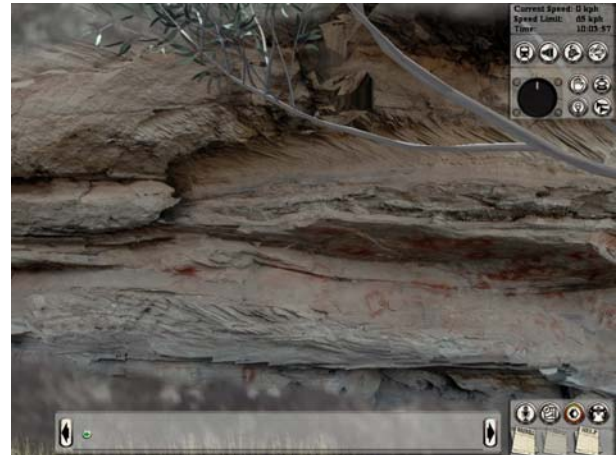


Figure 2. Screen shot of the Digital Songlines project interface showing Ancient Aboriginal rock art from Mt Moffat, Australia.

What the Digital Songlines project provides is a vehicle for the unfolding of real-time narratives involving Elders and the ancestral spirits of the landscape. These narratives consist of the network of Songlines that traverse the country and reinforce Aboriginal knowledge practices. At any one location in the landscape the user may be able to access information from any number of Songlines, which offer different perspectives on what exists in that place, who can be in that place, what activities can be done in that place, how that place came to be, what needs to be done to maintain that place, the ownership of that place, and many other deep and subtle nuances of Aboriginal knowledge.

## 7. Evaluation

The Digital Songlines project has been enthusiastically received by numerous Aboriginal communities, groups, schools and museums. These groups have grasped the opportunity to gather information relating to their particular area of “country” using a range of digital media. This is not only leading to the skilling of many community members in digital media, but is providing a cultural

focus for the sharing of knowledge practices between generations. Early, informal evaluation groups of Aboriginal adults and children have responded enthusiastically both to the Songlines concept and also to the visual interface and interactive activities that are possible within the Songlines environment.

More formal evaluation of the Songlines environment and user interactions will take place during 2006. They have the potential to yield rich data about the nature of representation of Aboriginal knowledge, the pedagogical implications for Aboriginal learners, and the participatory design process for the construction of accurate local landscapes and cultural activities.

## 8. Conclusion

In its review of the Digital Songlines project, this paper has explored some key questions around the nature of Aboriginal knowledge, issues surrounding appropriate representation of this knowledge and the way specific features of the Songlines environment appear to be addressing these key issues. We argued that environments should be responsive to the need for a database that reflects not only the content of knowledge but the forms of its communication in knowledge practices. We have argued that the key mechanisms for this aspect of representation of indigenous knowledge in the Songlines project lie in the combination of a user experience that is collaborative and performative with a sentient responsive landscape and a multi-layered narrative.

## 9. Acknowledgements

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